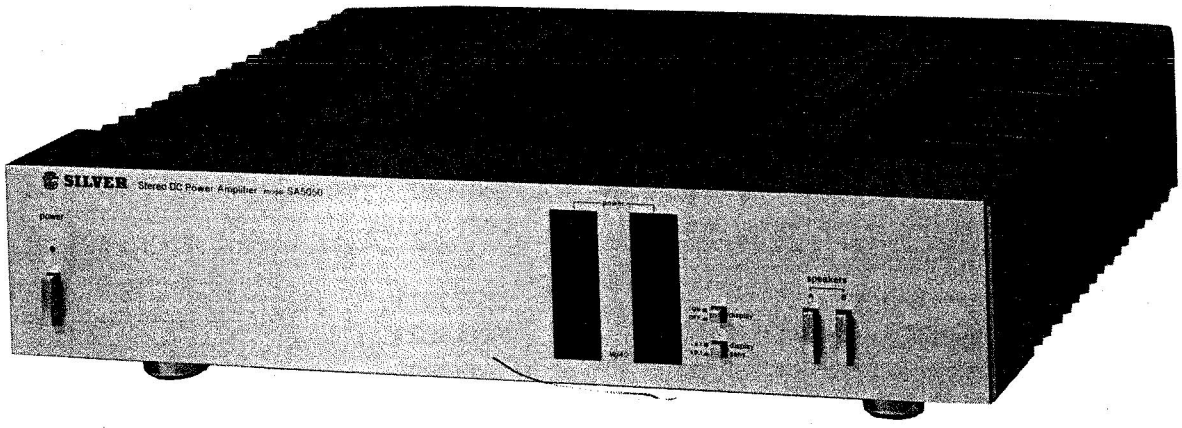
# SERVICE MANUAL
# SILVER

## MODEL SA5050



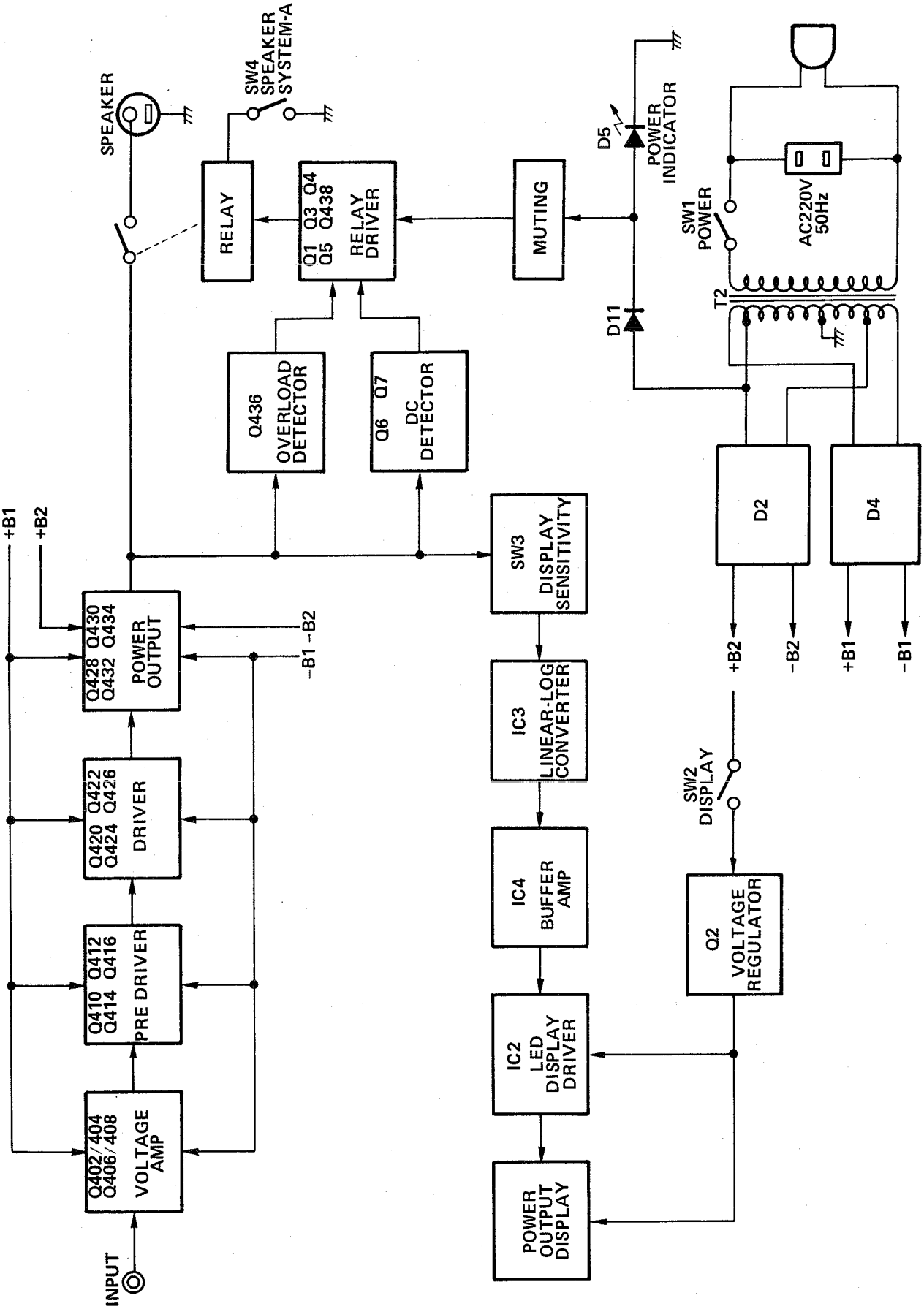

## SPECIFICATIONS

| | |
|---|---|
| POWER SUPPLY | AC220V 50Hz |
| POWER CONSUMPTION | 600 watts |
| DIMENSIONS | 385(W) x 72.5(H) x 320(D) mm |
| WEIGHT | 10.1 kg |
| CONTINUOUS POWER OUTPUT | 100 + 100 watts at 1 kHz, 4 ohm not more than 0.005% THD |
| INPUT SENSITIVITY/IMPEDANCE | 1.15V/35 k ohm |
| TOTAL HARMONIC DISTORTION | 0.0025% (1 kHz, 1/2 rated power) |
| INTERMODULATION DISTORTION | 0.005% |
| POWER BANDWIDTH | 10 Hz–100 kHz (0.03%THD) |
| FREQUENCY RESPONSE | <0.1 Hz–250 kHz |
| SIGNAL/NOISE RATIO | 124 dB (IHF–A) |
| DAMPING FACTOR | 55 (4 ohm) |
| CHANNEL SEPARATION | 80 dB |
| SLEW RATE | 150V/$\mu$ SEC. |

Specifications may be changed without notice.

**NOTE: When spare parts are needed, type the quantity desired in the "ORDER Q'TY" column of the order form in this Service Manual and send copy.**

## SCHEMATIC BLOCK DIAGRAM (L CH ONLY)



## METHOD OF DISASSEMBLING

1. Remove cabinet top cover by unscrewing 4 screws (A).
2. Remove cabinet bottom cover by unscrewing 6 self-tapping screws (B).
3. Remove 2 screws (C) and 5 self-tapping screws (D).
4. Pull out front panel assembly, and then disconnect LED power output display connectors and remove power indicator P.C. board.
5. Completely remove front panel assembly from the unit.
6. Remove power output display driver P.C. board by unscrewing 3 self-tapping screws (E).
7. Remove cabinet back with speaker output P.C. board by unscrewing 4 screws (F) and 3 self-tapping screws (G).
8. Remove speaker output P.C. board from cabinet back by unscrewing 1 screw (H) and disconnecting 4 rivets (I).
9. Remove Rch. main amp. P.C. board by unscrewing 2 self-tapping screws (J) and disconnecting connector.
10. Remove Lch. main amp. P.C. board by unscrewing 2 self-tapping screws (K) and disconnecting connector.
11. Remove Rch. power supply P.C. board with heat sink by unscrewing 2 screws (L) and 2 self-tapping screws (M).
12. Remove Lch. power supply P.C. board with heat sink by unscrewing 2 screws (N) and 2 self-tapping screws (O).

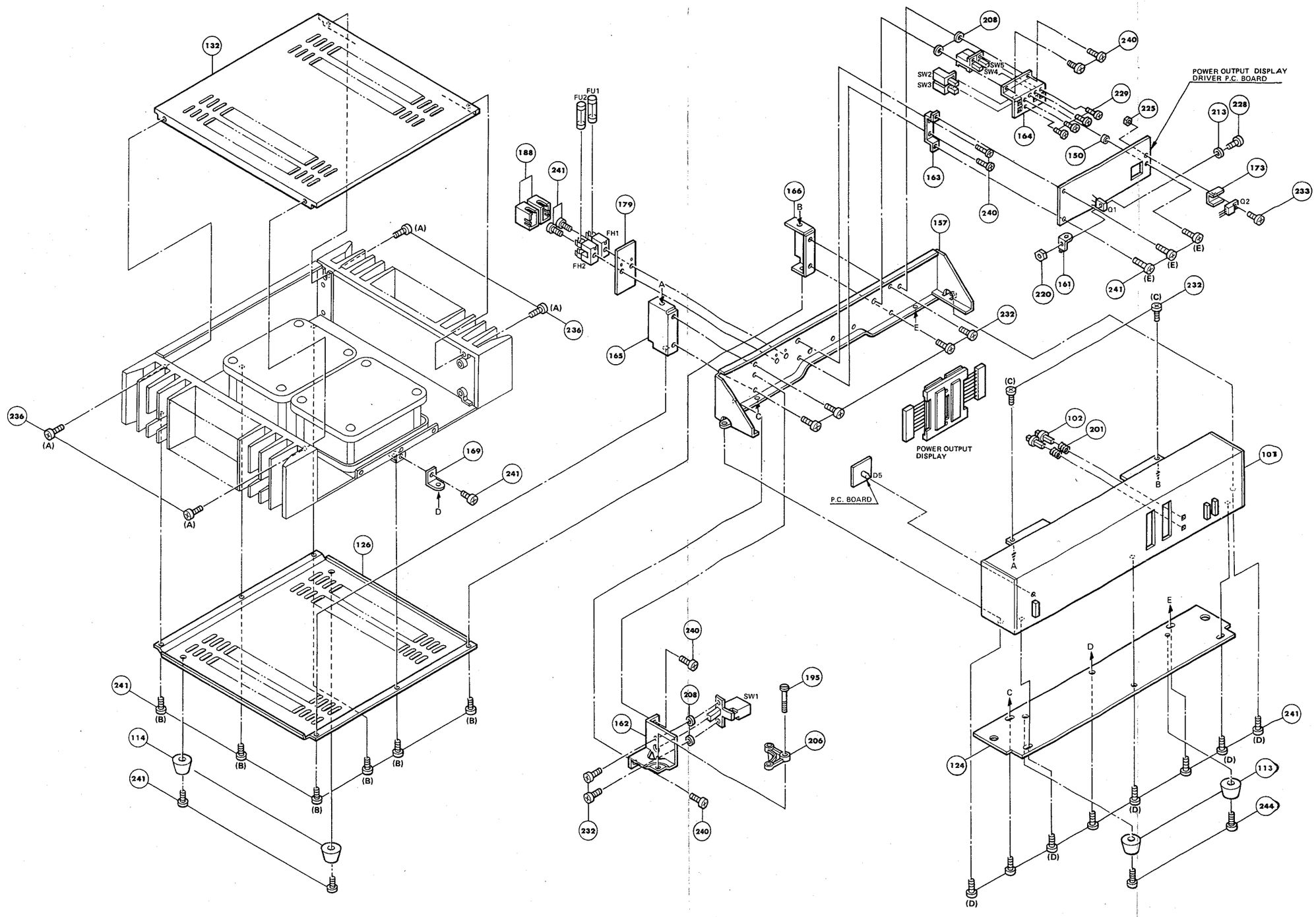
## GENERAL UNIT PARTS LIST

[MODEL SA5050]

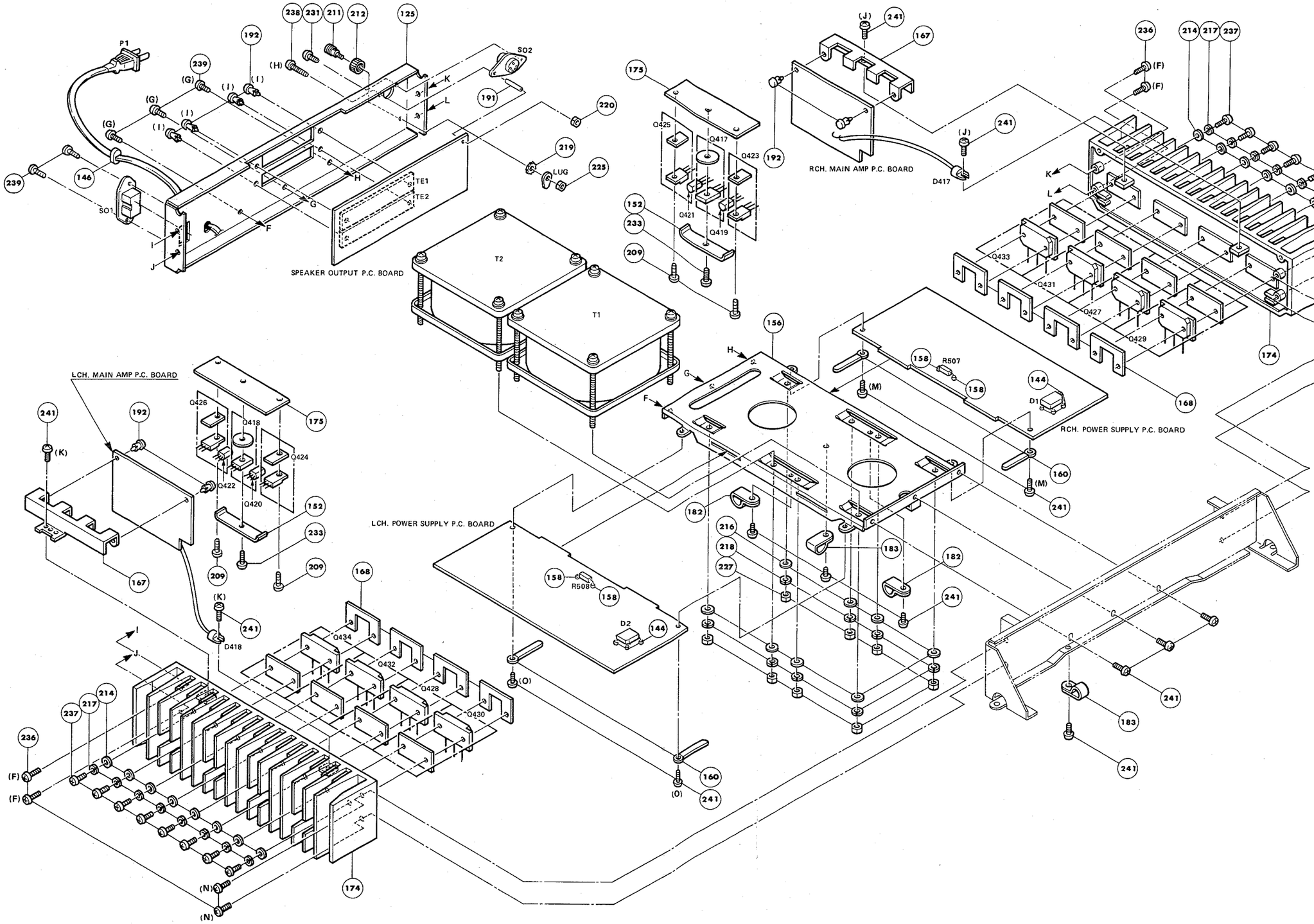
| SER. NO. | REF. NO. | DESCRIPTION | PART NO. | ORDER Q'TY | | |
|---|---|---|---|---|---|---|
| AA | 101 | Front Panel Assembly | A443-SA5050 | | | |
| AB | 102 | Push Button Assembly, Display, Display Sensitivity | A662-SA5050 | | | |
| 113 | 113 | Foot, Front (X2) | 1319-7130 | | | |
| 114 | 114 | Foot, Rear (X2) | 1319-7131 | | | |
| 124 | 124 | Cabinet Bottom, Front | 1423-00101 | | | |
| 125 | 125 | Cabinet Back | 1424-00401 | | | |
| 126 | 126 | Cabinet Bottom, Rear | 1424-00501 | | | |
| 132 | 132 | Cabinet Top | 1414-00601 | | | |
| 144 | 144 | Spacer (X45) | 2132-5049 | | | |
| 146 | 146 | Bushing, AC Line Cord | 2114-415027 | | | |
| 150 | 150 | Spacer, Power Output Display P.C. Board Retaining | 2132-7016 | | | |
| 152 | 152 | Bracket, Heat Sink (175) (X2) | 2218-7023 | | | |
| 156 | 156 | Chassis, Transformer | 2211-7191 | | | |
| 157 | 157 | Chassis, Front | 2211-7192 | | | |
| 158 | 158 | Spacer (X4) | 2132-7049 | | | |
| 160 | 160 | Fixing Bracket (X4) | 2218-7001 | | | |
| 161 | 161 | Bracket, Transistor (Q1) | 2219-7501 | | | |
| 162 | 162 | Bracket, Power Switch | 2219-7513 | | | |
| 163 | 163 | Bracket, Power Output Display P.C. Board | 2219-7514 | | | |

| SER. NO. | REF. NO. | DESCRIPTION | PART NO. | ORDER Q'TY | | |
|---|---|---|---|---|---|---|
| 164 | 164 | Bracket, Speakers and Display Switches | 2219-7515 | | | |
| 165 | 165 | Bracket, Chassis (157) | 2219-7516 | | | |
| 166 | 166 | Bracket, Chassis (157) | 2219-7517 | | | |
| 167 | 167 | Bracket, Main Amp. P.C. Board (X2) | 2219-7518 | | | |
| 168 | 168 | Bracket, Power Transistor Heat Sink (X8) | 2219-7528 | | | |
| 169 | 169 | Bracket, Chassis (156) | 2219-7529 | | | |
| 173 | 173 | Heat Sink, Voltage Regulator Transistor (Q2) | 2222-7081 | | | |
| 174 | 174 | Heat Sink, Main (X2) | 2222-7076 | | | |
| 175 | 175 | Heat Sink, Main Amp. P.C. Board (X2) | 2222-7077 | | | |
| 179 | 179 | Insulator, Fuse Holder | 2224-7057 | | | |
| 182 | 182 | Holder, Lead Wire Settle (X2) | 2240-7041 | | | |
| 183 | 183 | Holder, Lead Wire Settle (X2) | 2240-7077 | | | |
| 188 | 188 | Fuse Cover (X2) | 2240-7118 | | | |
| 191 | 191 | Spacer, DIN Socket | 2363-501710 | | | |
| 192 | 192 | Rivet, Speaker Terminal, Main Amp. P.C. Board (X8) | 2459-3005511 | | | |
| 195 | 195 | Special Screw, Power Switch Actuating Lever | 2601-402 | | | |
| 201 | 201 | Coil Spring, Display and Display Sensitivity Push Button (X2) | 2651-210186 | | | |
| 206 | 206 | Lever, Power Switch | 2672-7013 | | | |
| 208 | 208 | Flat Washer (3.2$\phi$ x 7$\phi$ x 0.5t) (X4) | 2411-30Z1 | | | |
| 209 | 209 | Special Screw (X4) | 2320-7004 | | | |
| 211 | 211 | Special Screw, Ground Terminal | 2310-7002 | | | |
| 212 | 212 | Special Nut, Ground Terminal | 2440-7001 | | | |
| 213 | 213 | Flat Washer (2.8$\phi$ x 6.5$\phi$ x 0.5t) | 2411-26Z1 | | | |
| 214 | 214 | Flat Washer (3.2$\phi$ x 7$\phi$ x 0.5t) (X16) | 2411-3041 | | | |
| 216 | 216 | Flat Washer (5.3$\phi$ x 10$\phi$ x 1t) (X8) | 2411-50Z1 | | | |
| 217 | 217 | Spring Washer (3.1$\phi$) (X16) | 2412-3022 | | | |
| 218 | 218 | Spring Washer (5.1$\phi$) (X8) | 2412-5022 | | | |
| 219 | 219 | Toothed Lock Washer (3.2$\phi$) | 2414-302 | | | |
| 220 | 220 | Hexagon Nut (M2.6) (X2) | 2446-261Z9 | | | |
| 225 | 225 | Hexagon Nut (M3) (X2) | 2446-301Z9 | | | |
| 227 | 227 | Hexagon Nut (M5) (X8) | 2446-501Z9 | | | |
| 228 | 228 | Screw (2.6 x 8 mm) | 2327-260829 | | | |
| 229 | 229 | Screw (2.6 x 6 mm) (X4) | 2327-260629 | | | |
| 231 | 231 | Screw (2.6 x 6 mm) | 2327-260649 | | | |
| 232 | 232 | Screw (3 x 6 mm) (X8) | 2327-300629 | | | |
| 233 | 233 | Screw (3 x 8 mm) (X3) | 2327-300829 | | | |
| 236 | 236 | Screw (3 x 14 mm) (X12) | 2327-301449 | | | |
| 237 | 237 | Screw (3 x 20 mm) (X16) | 2327-302049 | | | |
| 238 | 238 | Screw (2.6 x 20 mm) | 2327-262049 | | | |
| 239 | 239 | Self-Tapping Screw (3 x 8 mm) (X5) | 2347-300842 | | | |
| 240 | 240 | Self-Tapping Screw (3 x 5 mm) (X6) | 2347-300522 | | | |
| 241 | 241 | Self-Tapping Screw (3 x 8 mm) (X37) | 2347-300822 | | | |
| 244 | 244 | Self-Tapping Screw (3 x 12 mm) (X2) | 2347-301222 | | | |

# GENERAL UNIT EXPLODED VIEW



# GENERAL UNIT EXPLODED VIEW



# ALIGNMENT PROCEDURES

## DC VOLTAGE BALANCE ADJUSTMENT

**Equipment Required :** DC V.T.V.M.

**NOTE:** 1. Connect 4 ohm dummy load to terminal of speaker system-A.
2. Press in speaker system-A push button to ON (button in) position.

| Step | Connect Output Indicator To- | Adjust- | Adjust For- |
|---|---|---|---|
| 1 | DC V.T.V.M. to L ch terminal of speaker system-A | VR402 | 0V ± 10 mV |
| 2 | DC V.T.V.M. to R ch terminal of speaker system-A | VR401 | Same as above |

## IDLING CURRENT ADJUSTMENT

**Equipment Required :** Audio Signal Generator, AC V.T.V.M and Distortion Meter

**NOTE:** 1. Connect signal source to input socket.
2. Connect 4 ohm dummy load to terminal of speaker system-A.
3. Press in speaker system-A push button to ON (button in) position.

| Step | Signal Source | Connect Output Indicator To- | Adjust- | Adjust For- |
|---|---|---|---|---|
| 1 | 1 kHz of audio signal generator | AC V.T.V.M. to terminal of speaker system-A | Input level of audio signal generator | 20V (100W) |
| 2 | | Distortion meter to L ch terminal of speaker system-A | VR404 | Minimum distortion |
| 3 | | Distortion meter to R ch terminal of speaker system-A | VR403 | |

## POWER OUTPUT DISPLAY SENSITIVITY ADJUSTMENT

**Equipment Required :** Audio Signal Generator and AC V.T.V.M.

**NOTE:** 1. Connect signal source to input socket.
2. Connect 4 ohm dummy load and AC V.T.V.M. to terminal of speaker system-A.
3. Press in display sensitivity push button to x0.1 (button in) position.
4. Press in speaker system-A push button to ON (button in) position.

| Step | Signal Source | Output Indicator | Adjust- | Adjust For- |
|---|---|---|---|---|
| 1 | 1 kHz of audio signal generator | AC V.T.V.M. | Input level of audio signal generator | 8.94V (20W) |
| 2 | 1dB decrease input level of audio signal generator | L ch 200W LED of power output display | VR52 | LED light |
| 3 | | R ch 200W LED of power output display | VR51 | |

## SCHEMATIC DIAGRAM NOTES

1. All resistances are 1/4W carbon unless otherwise noted. Values are in ohms. k = 1000 M = 1000 k
2. All capacitance values are in MF unless otherwise noted. pF = MMF
3. This is a standard schematic diagram. Some set may be modified slightly for better performance.

### TRANSISTOR/IC ELEMENTS VOLTAGE CHART

Volts

| Q' NO. | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q401 Q402 | Q403 Q404 | Q405 Q406 | Q407 Q408 | Q409 Q410 | Q411 Q412 | Q413 Q414 | Q415 Q416 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BASE | 27 | 10 | 0 | 0.7 | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 0 | –40 | 40 | –40 | 40 |
| EMIT. | 27 | 9.2 | 0 | 0 | 0 | 0.1 | 0 | 0.4 | 0.5 | –0.5 | –0.5 | –40 | 40 | –40 | 40 |
| COLL. | 47 | 30 | 3.8 | 0.1 | 27 | 50 | 50 | –40 | –40 | 40 | 40 | 0 | 0 | –1.2 | 0.3 |

Volts

| Q' NO. | Q417 Q418 | Q419 Q420 | Q421 Q422 | Q423 Q424 | Q425 Q426 | Q427 Q428 | Q429 Q430 | Q431 Q432 | Q433 Q434 | Q435 Q436 | Q437 Q438 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BASE | –0.3 | –1.2 | 0.3 | –40 | 40 | –0.6 | –0.6 | –0.3 | –0.3 | –0.3 | 50 |
| EMIT. | 0.3 | –0.7 | –0.3 | –40 | 40 | –0.3 | –0.3 | 0.3 | 0.3 | –0.3 | 48 |
| COLL. | –1.2 | –40 | 40 | –0.6 | –0.3 | –36 | –36 | 38 | 38 | 50 | 0 |

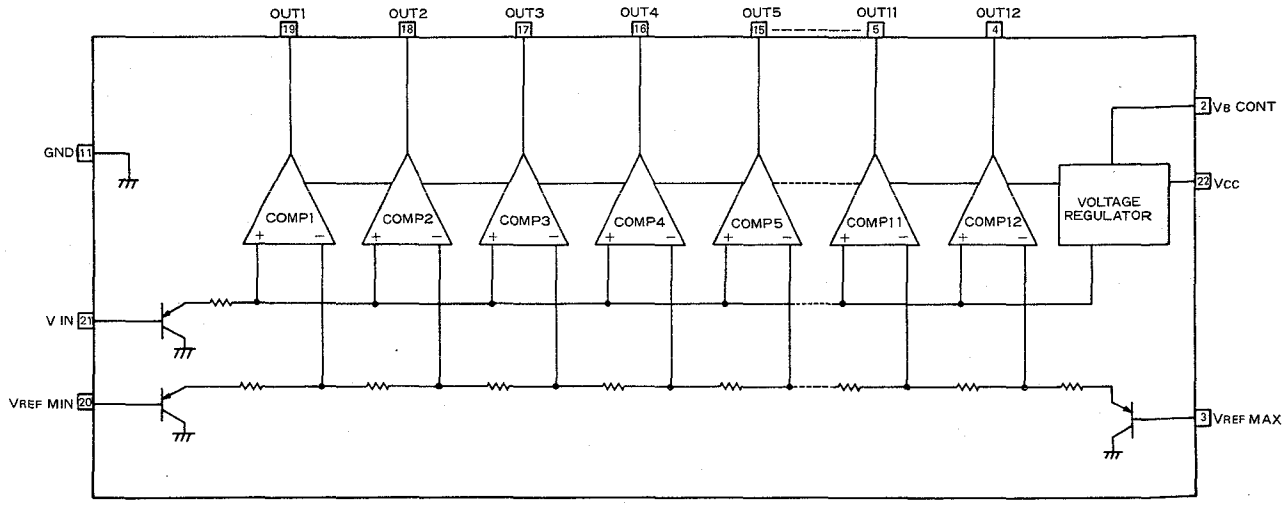
Volts

| TERMINAL NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IC1,IC2 | 0 | 0.3 | 4.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.2 |
| IC3 | 6.5 | 0 | 1.4 | 6.4 | 0 | 6.4 | 1.4 | 0 | 12 | | | | | | | | | | | | | |
| IC4 | 0 | 0 | 0 | –11.5 | 0 | 0 | 0 | –11.5 | | | | | | | | | | | | | | |

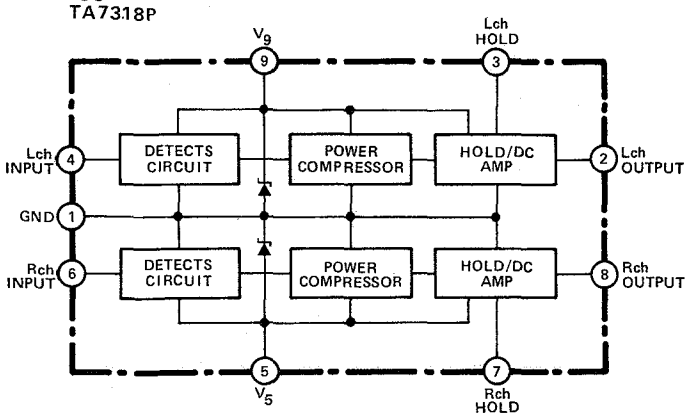
NOTE: All voltage readings from chassis are measured with V.T.V.M. under no signal conditions.

## IC BLOCK DIAGRAM

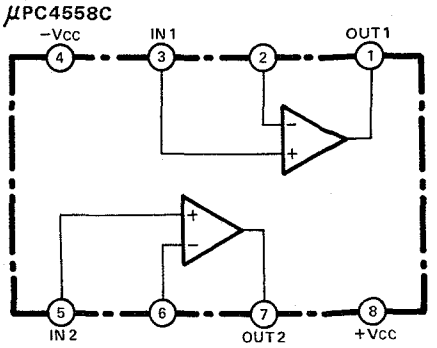
IC1 IC2
1R2406G



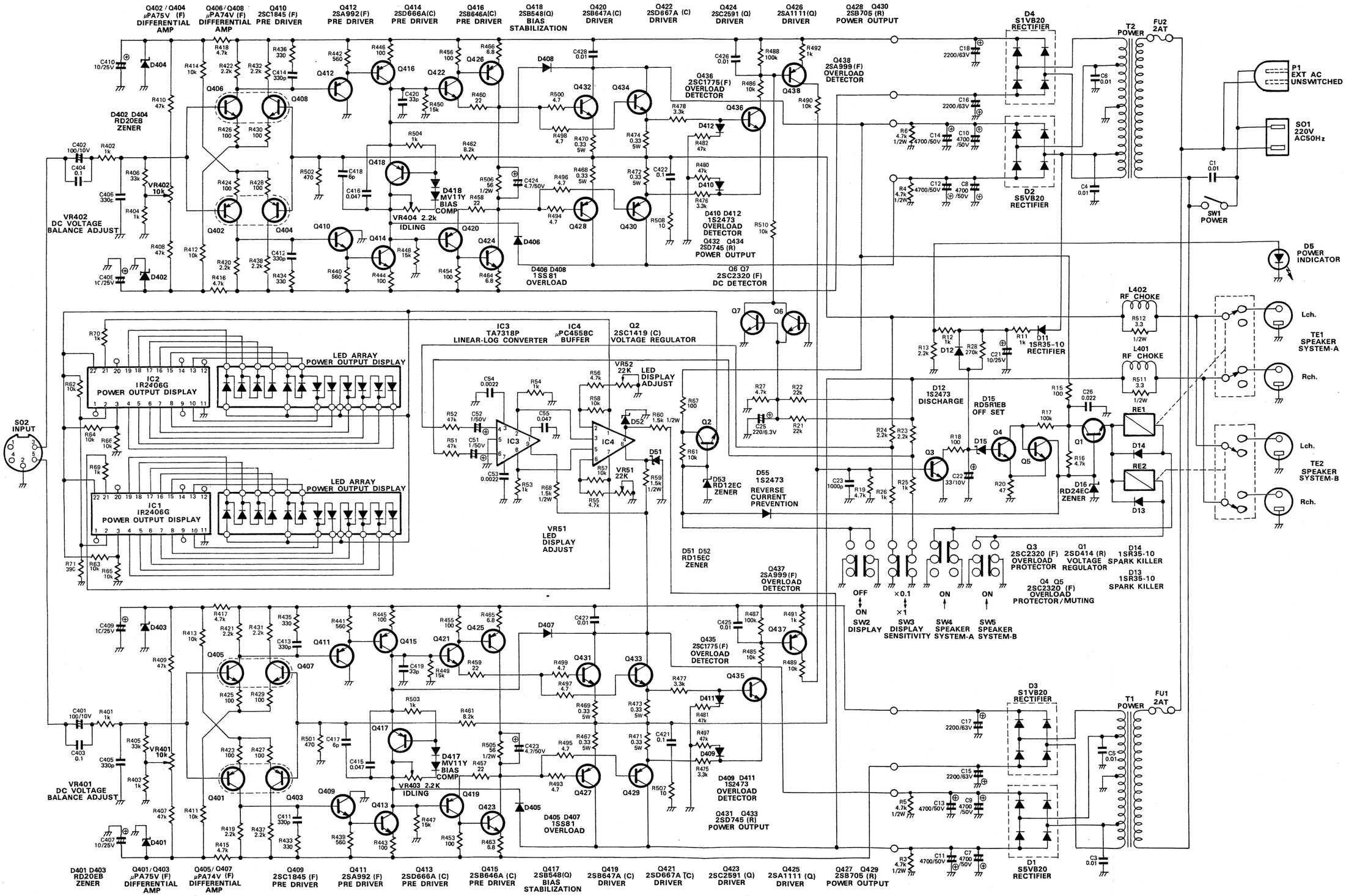

IC3
TA7318P



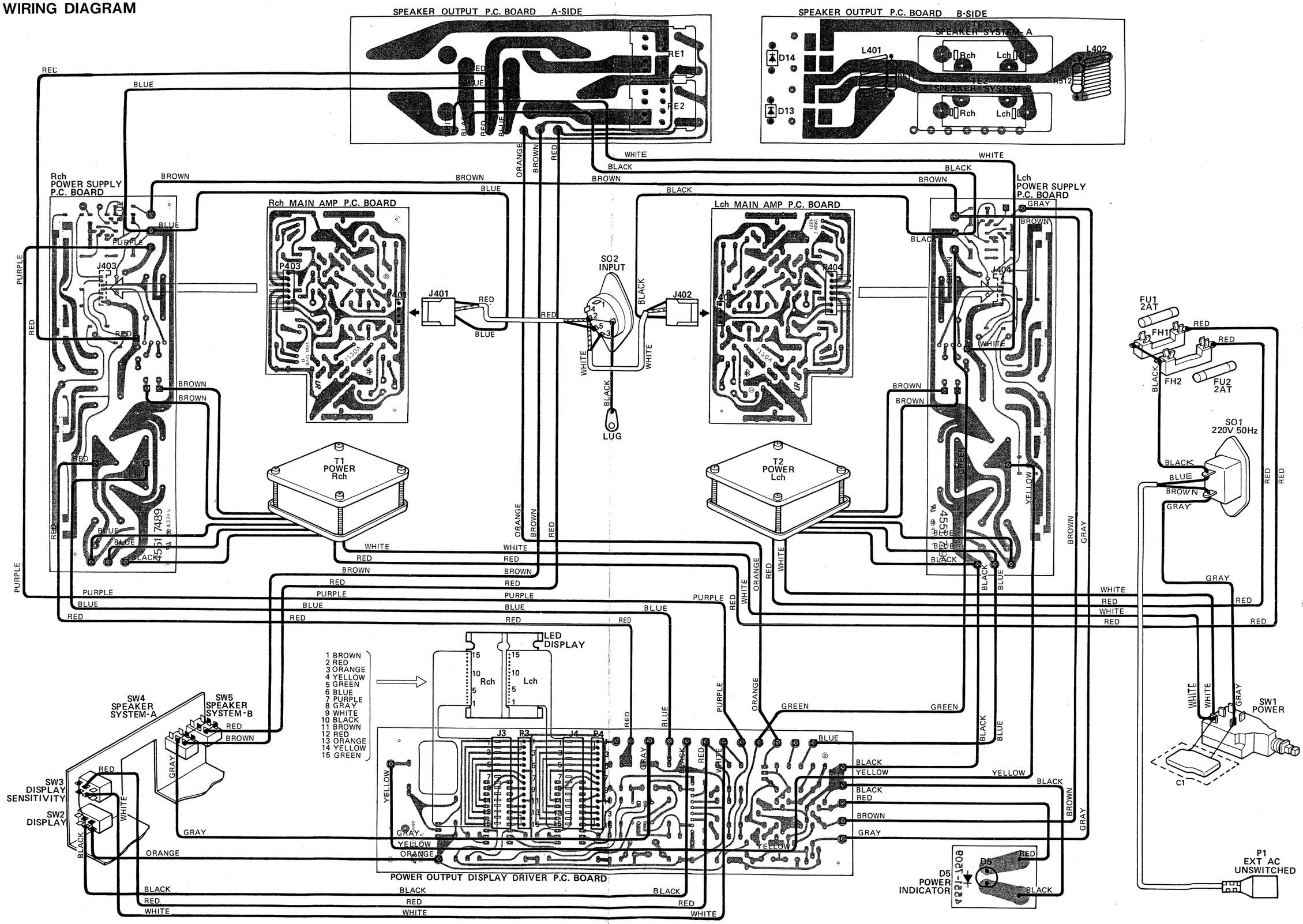

IC4
μPC4558C



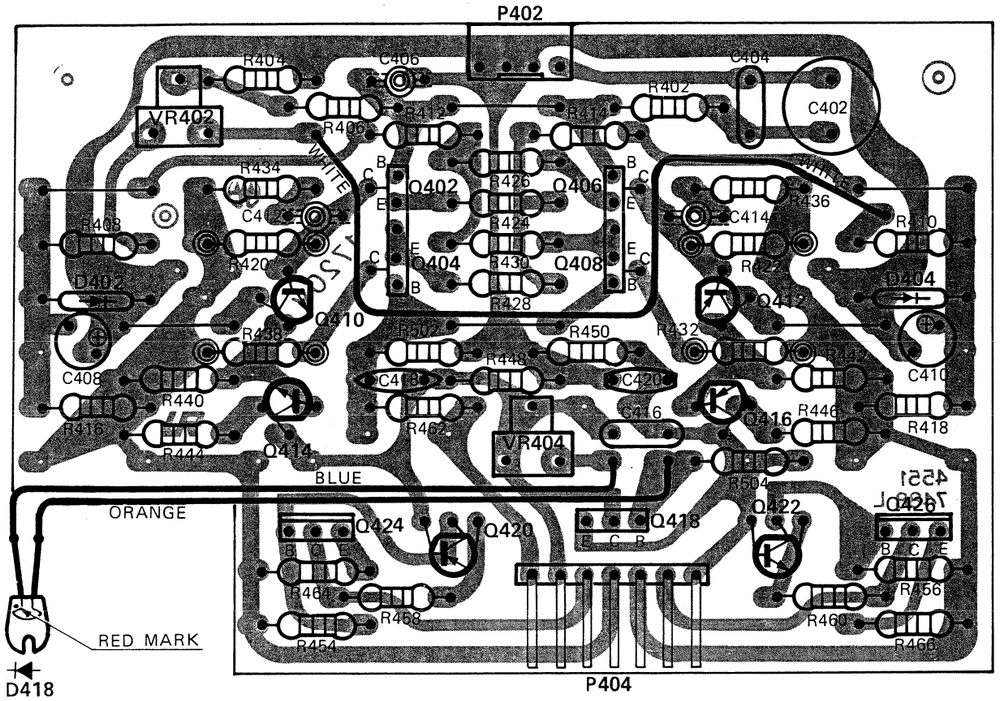
## SCHEMATIC DIAGRAM



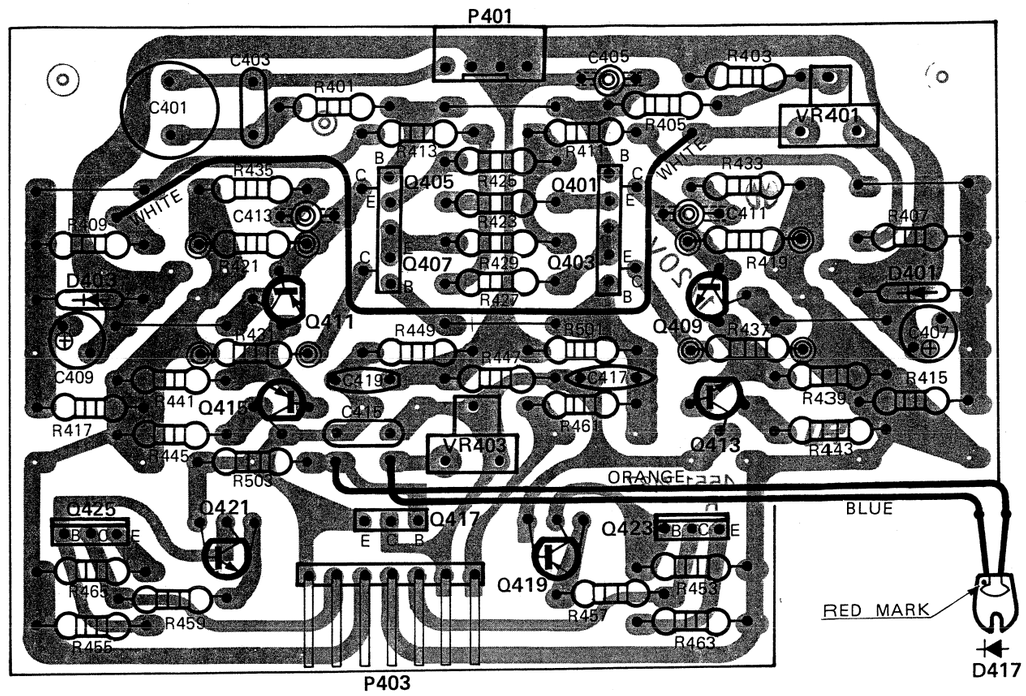
## WIRING DIAGRAM



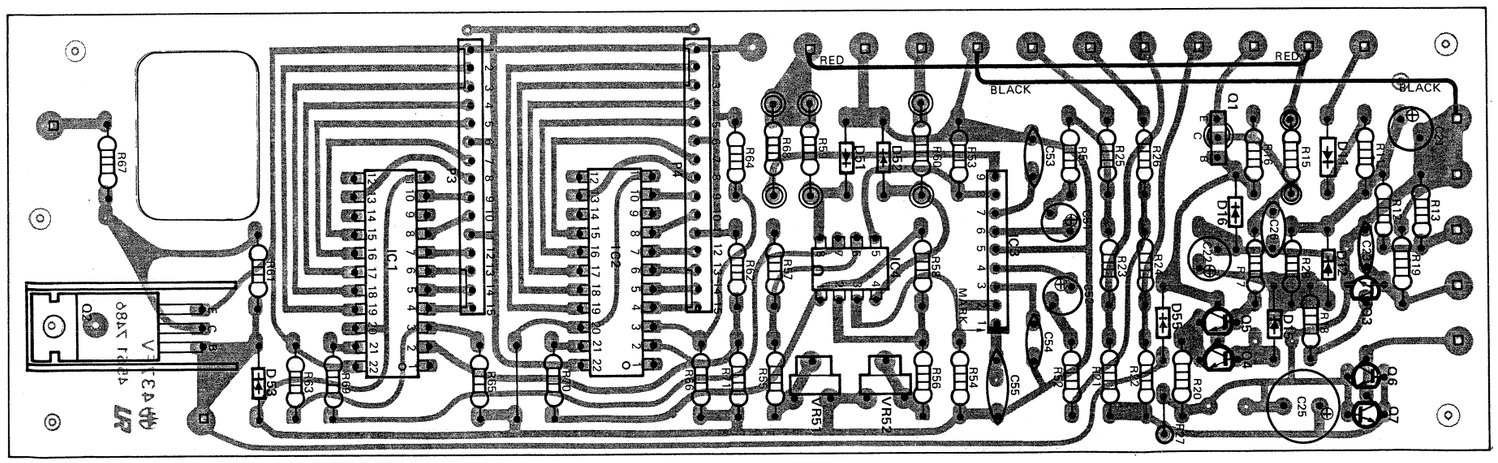
## L CH MAIN AMP P.C. BOARD




## R CH MAIN AMP P.C. BOARD



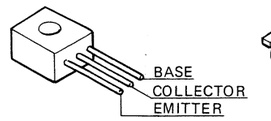

## POWER OUTPUT DISPLAY DRIVER P.C. BOARD



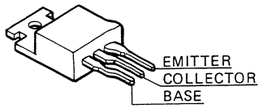



## TRANSISTOR VIEW

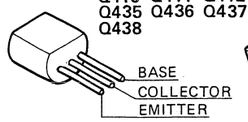
Q1 Q417 Q418



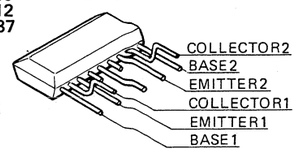

Q2 Q423 Q424
Q425 Q426



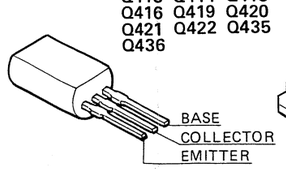

Q3 Q4 Q5
Q6 Q7 Q409
Q410 Q411 Q412
Q435 Q436 Q437
Q438



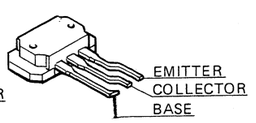

Q401/403 Q402/404
Q405/407 Q406/408




Q413 Q414 Q415
Q416 Q419 Q420
Q421 Q422 Q435
Q436



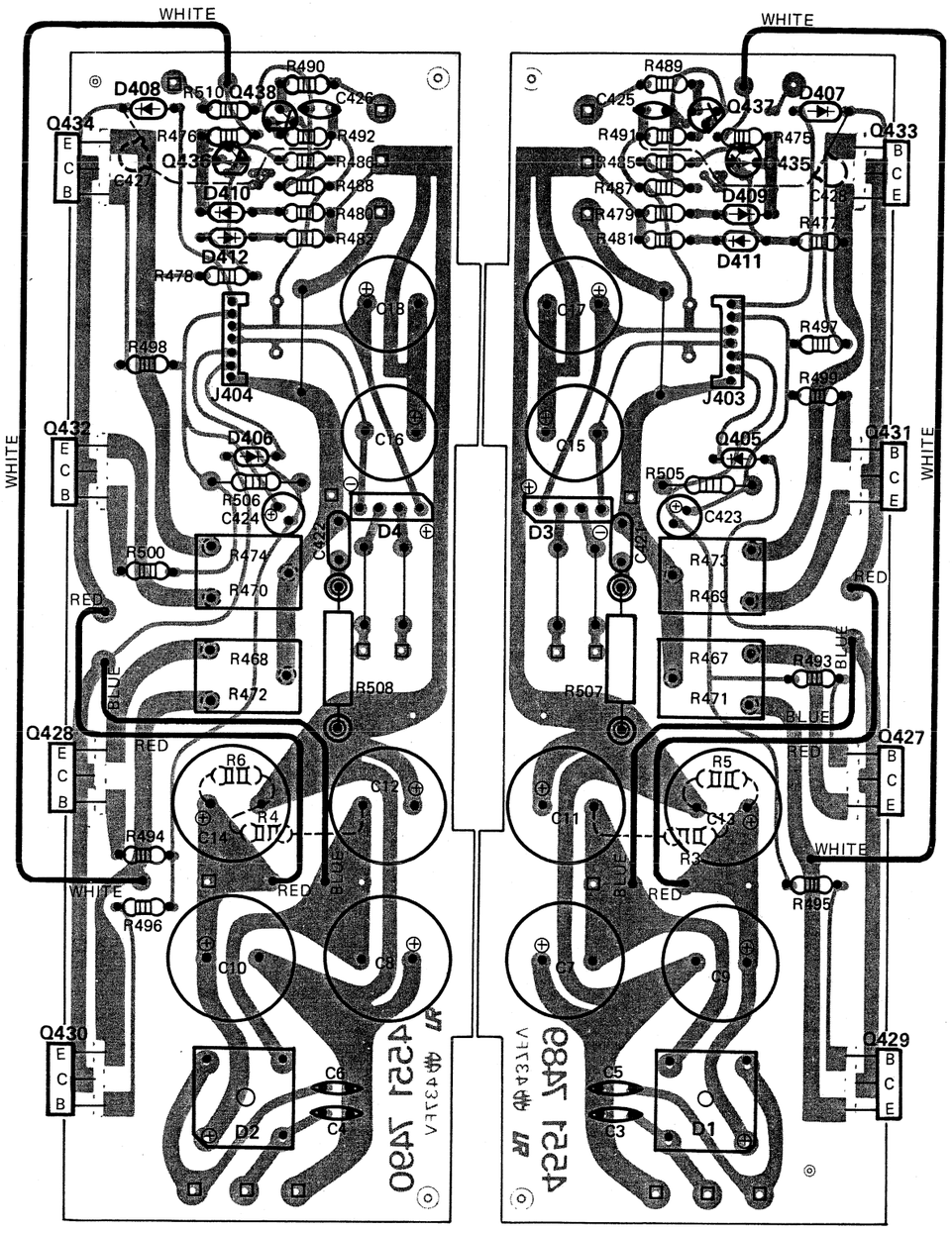

Q427 Q428 Q429
Q430 Q431 Q432
Q433 Q434



## POWER SUPPLY P.C. BOARD

L CH

R CH






## ELECTRICAL PARTS LIST

[MODEL SA5050]

| SER. NO. | REF. NO. | DESCRIPTION | PART NO. | ORDER Q'TY | | |
|---|---|---|---|---|---|---|
| | | **RESISTORS** | | | | |
| 755 | R15,67 | 100 ohm 1/4W Fuse | 5102-101579 | | | |
| 754 | R59,60,68 | 1.5 k ohm 1/2W Metal | 5176-152582 | | | |
| 651 | R423,424,425,426, 427,428,429,430 | 100 ohm 1/4W Metal | 5174-101381 | | | |
| 641 | R439,440,441,442 | 560 ohm 1/4W Fuse | 5102-5614713 | | | |
| 640 | R443,444,445,446 | 100 ohm 1/4W Fuse | 5102-101579 | | | |
| 655 | R447,448,449,450 | 15 k ohm 1/4W Metal | 5174-153381 | | | |
| 639 | R453,454,455,456 | 100 ohm 1/4W Fuse | 5102-101579 | | | |
| 654 | R461,462 | 8.2 k ohm 1/4W Metal | 5174-822381 | | | |
| 638 | R463,464,465,466 | 6.8 ohm 1W Fuse | 5102-6R85711 | | | |
| 623 | R467/471,468/472, 469/473,470/474 | 0.33 ohm 5W Cement (Special Dual) | 5275-R33671 | | | |
| 702 | R491,492 | 1 k ohm 1/4W Fuse | 5102-1024713 | | | |
| 653 | R501,502 | 470 ohm 1/4W Metal | 5174-471381 | | | |
| 637 | R505,506 | 56 ohm 1/2W Fuse | 5102-5605710 | | | |
| 624 | R507,508 | 10 ohm 5W Cement | 5275-100681 | | | |
| 751 | VR51,52 | Variable Resistor, 22 k ohm, LED Display Adjustment | 5101-2238575 | | | |
| 618 | VR401,402 | Variable Resistor, 10 k ohm, DC Voltage Balance Adjustment | 5101-1038375 | | | |
| 617 | VR403,404 | Variable Resistor, 2.2 k ohm, Idling | 5101-2227275 | | | |
| | | **CAPACITORS** | | | | |
| 828 | C1 | 0.01MF AC250V Metalized Polyester | 5352-1030955 | | | |
| 782 | C7,8,9,10,11,12,13, 14 | 4700MF 50V Electrolytic | 5341-478F0266 | | | |
| 787 | C15,16,17,18 | 2200MF 63V Electrolytic | 5341-228G0269 | | | |
| 628 | C403,404 | 0.1MF 50V Mylar | 5354-104K1HM | | | |
| 627 | C405,406,411,412, 413,414 | 330PF 50V Stylor | 5355-331J1HS | | | |
| 630 | C415,416 | 0.047MF 50V Mylar | 5354-473K1HM | | | |
| 626 | C419,420 | 33PF 300V Mica | 5353-330232 | | | |
| 629 | C421,422 | 0.1MF 50V Mylar | 5354-104K1HM | | | |
| | | **SEMICONDUCTORS** | | | | |
| 772 | Q1 | Transistor (2SD414(R)), Voltage Regulator | 5614-414(R) | | | |
| 744 | Q2 | Transistor (2SC1419(C)), Voltage Regulator | 5613-1419(C) | | | |
| 683 | Q3,4,5,6,7 | Transistor (2SC2320(F)), Overload Protector, Overload Protector/ Muting, DC Detector | 5613-2320(F) | | | |
| 591 | Q401/403,402/404 | Dual Transistor ($\mu$PA75V(F)), Differential Amp. | 5611-$\mu$PA75V(F) | | | |
| 592 | Q405/407,406/408 | Dual Transistor ($\mu$PA74V(F)), Differential Amp. | 5613-$\mu$PA74V(F) | | | |
| 594 | Q409,410 | Transistor (2SC1845(F)), Predriver | 5613-1845(F) | | | |
| 593 | Q411,412 | Transistor (2SA992(F)), Predriver | 5611-992(F) | | | |
| 596 | Q413,414 | Transistor (2SD666A(C)), Predriver | 5614-666A(C) | | | |
| 595 | Q415,416 | Transistor (2SB646A(C)), Predriver | 5612-646A(C) | | | |
| 609 | Q417,418 | Transistor (2SB548(Q)), Bias Stabilization | 5612-548(Q) | | | |
| 597 | Q419,420 | Transistor (2SB647A(C)), Driver | 5612-647A(C) | | | |

| SER. NO. | REF. NO. | DESCRIPTION | PART NO. | ORDER Q'TY | | |
|---|---|---|---|---|---|---|
| 598 | Q421,422 | Transistor (2SD667A(C)), Driver | 5614-667A(C) | | | |
| 601 | Q423,424 | Transistor (2SC2591(Q)), Driver | 5613-2591(Q) | | | |
| 599 | Q425,426 | Transistor (2SA1111(Q)), Driver | 5611-1111(Q) | | | |
| 603 | Q427,428,429,430 | Transistor (2SB705(R)), Power Output | 5612-705(R) | | | |
| 606 | Q431,432,433,434 | Transistor (2SD745(R)), Power Output | 5614-745(R) | | | |
| 684 | Q435,436 | Transistor (2SC1775(F)), Overload Detector | 5613-1775(F) | | | |
| 682 | Q437,438 | Transistor (2SA999(F)), Overload Detector | 5611-999(F) | | | |
| 743 | IC1,2 | Integrated Circuit, Power Output Display | 5652-IR2406G | | | |
| 741 | IC3 | Integrated Circuit, Linear-Log Converter | 5652-TA7318P | | | |
| 742 | IC4 | Integrated Circuit, Buffer | 5652-$\mu$PC4558C | | | |
| 776 | D1,2 | Bridge Silicon Diode, Rectifier | 5685-S5VB20 | | | |
| 773 | D3,4 | Bridge Silicon Diode, Rectifier | 5685-S1VB20 | | | |
| 805 | D5 | Light Emitting Diode, Power Indicator | 5637-GL2PR1 | | | |
| 690 | D11,13,14 | Diode, Rectifier, Spark Killer | 5632-1SR35-10 | | | |
| 689 | D12, 55, 409, 410, 411, 412 | Diode, Discharge, Reverse Current Prevention, Overload Detector | 5636-1S2473 | | | |
| 692 | D15 | Zener Diode (5.1V ± 0.3V), Off Set | 5635-RD5R1EB | | | |
| 777 | D16 | Zener Diode (25.8V ± 1.8V) | 5635-RD24EC | | | |
| 747 | D51,52 | Zener Diode (15.6V ± 0.9V) | 5635-RD15EC | | | |
| 748 | D53 | Zener Diode (12.7V ± 0.8V) | 5635-RD12EC | | | |
| 612 | D401,402,403,404 | Zener Diode (20V ± 1.2V) | 5635-RD20EB | | | |
| 613 | D405,406,407,408 | Diode, Overload | 5636-1SS81 | | | |
| 615 | D417,418 | Varistor, Bias Compensation | 5641-MV11Y | | | |
| 806 | D709, 710 | LED Display, Power Output | 5623-S-5014BT | | | |

## COILS AND TRANSFORMERS

| | | | | | | |
|---|---|---|---|---|---|---|
| 621 | L401,402 | Coil, RF Choke | 5991-7125 | | | |
| 771 | T1,2 | Transformer, Power | 5584-701253 | | | |

## MISCELLANEOUS

| | | | | | | |
|---|---|---|---|---|---|---|
| 801 | SW1 | Push Switch, Power | 4431-01017658 | | | |
| 803 | SW2,3,4,5 | Push Switch, Display, Display Sensitivity, Speaker System-A, Speaker System-B | 4431-01027169 | | | |
| 815 | TE1,2 | Speaker Output Terminal | 4474-65 | | | |
| 813 | SO1 | AC Socket | 4474-126 | | | |
| 816 | SO2 | DIN Socket, Input | 4474-46 | | | |
| 809 | FU1,2 | Fuse, 2AT | 5732-20202 | | | |
| 808 | FH1,2 | Fuse Holder | 4472-416 | | | |
| 693 | RE1,2 | Relay, Speaker ON/OFF | 4331-20247110 | | | |
| 825 | J3/4 | Connector with Lead Wire (15 Pin) | 4163-71327 | | | |
| 826 | J401 | Connector with Lead Wire (4 Pin) | 4163-71627 | | | |
| 824 | J402 | Connector with Lead Wire (4 Pin) | 4163-71227 | | | |
| 791 | J403,404 | Connector (7 Pin) | 4443-077149 | | | |
| 811 | P1 | Cord with Plug, Ext. AC Unswitched | 4161-71107 | | | |
| 769 | P3,4 | Connector (15 Pin) | 4443-157114 | | | |
| 619 | P401,402 | Connector (4 Pin) | 4443-047114 | | | |
| 620 | P403,404 | Connector (7 Pin) | 4443-07418 | | | |
| 810 | | AC Line Cord with Plug | 4161-71108 | | | |